



BILLING CODE 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XD229

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to a Geohazard Survey in the Beaufort Sea, Alaska

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an incidental harassment authorization.

SUMMARY: In accordance with the Marine Mammal Protection Act (MMPA) regulations, notice is hereby given that NMFS has issued an Incidental Harassment Authorization (IHA) to BP Exploration (Alaska) Inc. (BP) to take marine mammals, by harassment, incidental to conducting a shallow geohazard survey in Foggy Island Bay, Beaufort Sea, Alaska, during the 2014 open water season.

DATES: Effective July 1, 2014, through September 30, 2014.

ADDRESSES: Electronic copies of the IHA, application, and associated Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) may be obtained by writing to Jolie Harrison, Supervisor, Incidental Take Program, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910, telephoning the contact listed below (see FOR FURTHER INFORMATION CONTACT), or visiting the internet at:

<http://www.nmfs.noaa.gov/pr/permits/incidental.htm>. Documents cited in this notice may also be viewed, by appointment, during regular business hours, at the aforementioned address.

FOR FURTHER INFORMATION CONTACT: Candace Nachman, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 et seq.) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking, other means of effecting the least practicable impact on the species or stock and its habitat, and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth. NMFS has defined “negligible impact” in 50 CFR 216.103 as “...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.”

Except with respect to certain activities not pertinent here, the MMPA defines “harassment” as: “any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption

of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].”

Summary of Request

On February 4, 2014, NMFS received an application from BP for the taking of marine mammals incidental to conducting a shallow geohazard survey. NMFS determined that the application was adequate and complete on March 6, 2014.

BP proposes to conduct a shallow geohazard survey in Federal and state waters of Foggy Island Bay in the Beaufort Sea during the open-water season of 2014. The activity would occur between July 1 and September 30; however, airgun and other sound source equipment operations would cease on August 25. The following specific aspects of the activity are likely to result in the take of marine mammals: airguns and scientific sonars/devices. Take, by Level B harassment only, of 9 marine mammal species is anticipated to result from the specified activity.

Description of the Specified Activity

Overview

BP’s proposed shallow geohazard survey would consist of two phases: a site survey and a sonar survey. During the first phase, the Site Survey, the emphasis is on obtaining shallow geohazard data using an airgun array and a towed streamer. During the second phase, the Sonar Survey, data will be acquired both in the Site Survey location and subsea pipeline corridor area (see Figure 1 in BP’s application) using the multibeam echosounder, sidescan sonar, subbottom profiler, and the magnetometer. The total discharge volume of the airgun array will not exceed 30 cubic inches (in³).

The purpose of the proposed shallow geohazard survey is to evaluate development of the Liberty field. The Liberty reservoir is located in federal waters in Foggy Island Bay about 8

miles (mi) east of the Endicott Satellite Drilling Island. The project's preferred alternative is to build a gravel island situated over the reservoir. In support of the preferred alternative, a Site Survey is planned with an emphasis on obtaining two-dimensional high-resolution shallow geohazard data using an airgun array and a towed streamer. Additional infrastructure required for the preferred alternative would include a subsea pipeline. A Sonar Survey, using multibeam echosounder, sidescan sonar, subbottom profiler, and magnetometer is proposed over the Site Survey location and subsea pipeline corridor area. The purpose of this proposed survey is to evaluate the existence and location of archaeological resources and potential geologic hazards on the seafloor and in the shallow subsurface.

Dates and Duration

The planned start date is approximately July 1, 2014, with data acquisition beginning when open water conditions allow. The survey is expected to take approximately 20 days to complete, not including weather downtime. Each phase of the survey (i.e., site survey and sonar survey) has an expected duration of 7.5 days based on a 24-hour workday. Between the first and second phase, the operations will be focused on changing equipment for about 5 days (i.e., no active sound sources would be used to acquire data during this time). To limit potential impacts to the bowhead whale fall migration and subsistence hunting, airgun and sonar operations will conclude by midnight on August 25. Demobilization of equipment would continue after airgun and sonar operations end but would be completed by September 30. Therefore, the dates for the IHA are July 1 through September 30, 2014.

Specified Geographic Region

The proposed shallow geohazards survey would occur in Federal and state waters of Foggy Island Bay in the Beaufort Sea, Alaska. The project area lies mainly within the Liberty

Unit but also includes portions of the Duck Island Unit, as well as non-unit areas. Figure 1 in BP's application outlines the proposed survey acquisition areas, including proposed boundaries for the two phases of the project. The Phase 1 Site Survey, focused on obtaining shallow geohazard data using an airgun array and towed streamer, will occur within approximately 12 mi². The Phase 2 Sonar Survey will occur over the Site Survey area and over approximately 5 mi² within the 29 mi² area identified in Figure 1 of BP's application. Water depth in this area ranges from about 2-24 ft. Activity outside the area delineated in Figure 1 of BP's application may include vessel turning while using airguns, vessel transit, and other vessel movements for project support and logistics. The approximate boundaries of the two survey areas are between 70°14'10'' N. and 70°20'20'' N. and between 147°29'05'' W. and 148°52'30'' W.

Detailed Description of Activities

The activities associated with the proposed shallow geohazard survey include vessel mobilization, navigation and data management, housing and logistics, and data acquisition. The Notice of Proposed IHA (79 FR 21522, April 16, 2014) contains a full detailed description of the shallow geohazard survey, including sound source information. That information has not changed and is therefore not repeated here.

Comments and Responses

A Notice of Proposed IHA was published in the Federal Register on April 16, 2014 (79 FR 21522) for public comment. During the 30-day public comment period, NMFS received three comment letters from the following: the Marine Mammal Commission (MMC) and two private citizens. All of the public comments received on the Notice of Proposed IHA are available on the Internet at:

http://www.nmfs.noaa.gov/pr/pdfs/permits/bp_liberty_comments.pdf. Following is a summary

of the comments and NMFS' responses.

Comment 1: One private citizen letter requested denial of the IHA because of the harm to the environment. The other private citizen letter requested denial of the IHA because of the pollution that would be caused by the activity.

Response: As described in detail in the proposed IHA notice and summarized here, the only anticipated impacts from the shallow geohazard survey is short-term changes in behavior of a few marine mammal species. BP has designed the survey to avoid the peak times of year when cetaceans are present in the vicinity. Moreover, seismic surveys will not cause long-term harm to or cause pollution of the marine environment. BP is required to implement mitigation and monitoring measures (described later in this document) to minimize impacts to marine mammals and their habitats.

Comment 2: The MMC states that NMFS has proposed takes associated with the use of the seismic airguns; however, no takes were proposed for the use of the other sound sources, including the multibeam echosounder, sidescan sonar, and sub-bottom profiler. Of particular concern to the MMC is the lack of proposed takes associated with the sub-bottom profiler, a non-impulsive, intermittent sound source. Researchers have observed that various species of marine mammals, including harbor porpoises, respond to sound from sources with characteristics similar to a sub-bottom profiler and at received levels below 160 dB re 1 μ Pa. The temporal and spectral characteristics of such sources suggest that a precautionary Level B harassment threshold of 120 dB re 1 μ Pa should be used when establishing harassment zones, estimating takes, and developing mitigation measures. The MMC recommends that NMFS require BP to (1) include take estimates resulting from the use of the sub-bottom profiler based on the 120-dB re 1 μ Pa threshold and (2) revise its monitoring measures as necessary to include monitoring of sub-

bottom profiler activities.

Response: Intermittent sounds can be defined as either impulsive or non-impulsive. Impulsive sounds have been defined as sounds which are typically transient, brief (< 1 sec), broadband, and consist of a high peak pressure with rapid rise time and rapid decay (ANSI, 1986; NIOSH, 1998). Sub-bottom profiler signals have durations that are typically very brief (< 1 sec), with temporal characteristics that more closely resemble those of impulsive sounds than non-impulsive sounds, which typically have more gradual rise times and longer decays (ANSI, 1995; NIOSH, 1998). With regard to behavioral thresholds, we therefore consider the temporal and spectral characteristics of sub-bottom profiler signals to more closely resemble those of an impulse sound. Additionally, a sub-bottom profiler's "rapid staccato" of pulse trains is emitted in a similar fashion as odontocete echolocation click trains. Research indicates that marine mammals, in general, have extremely fine auditory temporal resolution and can detect each signal separately (e.g., Au et al., 1988; Dolphin et al., 1995; Supin and Popov, 1995; Mooney et al., 2009), especially for species with echolocation capabilities. Therefore, marine mammals would likely perceive sub-bottom profiler signals as being impulsive. Consequently, the 160-dB threshold (typically associated with impulsive sources) is more appropriate than the 120-dB threshold (typically associated with continuous sources) for estimating takes by behavioral harassment incidental to use of such sources.

Regardless of which threshold is used to estimate Level B harassment take, based on the 160 dB and 120 dB radii, less than 0.1 beluga whales and less than 0.1 bowhead whales would be exposed at either sound level. Based on this information, any take that may potentially occur from the sub-bottom profiler is already accounted for in the authorized take estimates. Therefore, NMFS has not increased the take estimates. Moreover, NMFS determined that

additional monitoring measures are not necessary to include monitoring specifically for sub-bottom profilers. Protected Species Observers (PSOs) will be on-duty during all daylight hours (with no periods of darkness anticipated until mid-August). The distances to the 160- and 120-dB isopleths from the sub-bottom profiler are 30 m and 450 m, respectively. Therefore, additional monitoring measures beyond those already required are not needed to observe this zone.

Comment 3: According to the MMC, an accurate characterization of the size of the harassment zone is necessary for obtaining reliable estimates of the numbers of animals taken. The MMC disagrees with using the area of a circle to estimate the size of the ensonified area. According to the MMC, this would only be correct if the sound source were stationary. For surveys in which the source is moving (i.e., towed airgun arrays), the ensonified area should instead be based on the total linear distance surveyed by the vessel in a day, taking into account the distance to the Level B harassment threshold, which would presumably produce an area greater than that calculated by using the area of a circle. BP and NMFS should use that revised estimate of the ensonified area to determine the numbers of animals that could be taken. The MMC recommends that NMFS require BP to recalculate take estimates for beluga and bowhead whales and ringed, bearded, and spotted seals incidental to seismic airguns using the revised ensonified area estimate for a moving sound source. The MMC further recommends that NMFS require BP to estimate take incidental to the use of the sub-bottom profiler based on an ensonified area for the sub-bottom profiler for a moving sound source.

Response: In shallow water heterogeneous environments (such as that for the proposed survey), propagation conditions change as the vessel moves; therefore, using the total linear distance surveyed by the vessel in a day would not necessarily result in estimates that are any

more accurate than the method of using the area of a circle. In deeper water with more constant oceanographic and bathymetric conditions, a complex polygon based on propagation modeling is likely a better method to employ. However, BP will conduct surveys in extremely shallow water (generally less than about 30 ft). NMFS agrees that the methods used to calculate take provide an accurate representation of the numbers of marine mammals that may potentially occur in the Level B harassment zone. As explained in the response to Comment 2, NMFS determined that additional takes do not need to be added as a result of use of the sub-bottom profiler.

Comment 4: The MMC states that BP has proposed that observers would monitor for marine mammals 30 minutes before and during the proposed activities. NMFS agreed with that approach but did not include a requirement for post-activity monitoring. The MMC states, in general, post-activity monitoring is needed to ensure that marine mammals are not taken in unexpected or unauthorized ways or in unanticipated numbers. Some types of taking (e.g., taking by death or serious injury) may not be observed until after the activity has ceased. Post-activity monitoring is the best way, and in some situations may be the only reliable way, to detect certain impacts. Accordingly, the MMC recommends that NMFS require BP to monitor for marine mammals 30 minutes before, during, and 30 minutes after the proposed activities.

Response: NMFS has included a requirement in the IHA that observers monitor for marine mammals 30 minutes before, during, and 30 minutes after the use of the seismic airguns and other active sound sources.

Description of Marine Mammals in the Area of the Specified Activity

The Beaufort Sea supports a diverse assemblage of marine mammals. Table 1 lists the 12 marine mammal species under NMFS jurisdiction with confirmed or possible occurrence in the proposed project area.

Table 1. Marine mammal species with confirmed or possible occurrence in the seismic survey area.

Common Name	Scientific Name	Status	Occurrence	Seasonality	Range	Abundance
Odontocetes						
Beluga whale (Beaufort Sea stock)	<u>Delphinapterus leucas</u>	-	Common	Mostly spring and fall with some in summer	Russia to Canada	39,258
Killer whale	<u>Orcinus orca</u>	-	Occasional/Extralimital	Mostly summer and early fall	California to Alaska	552
Harbor porpoise	<u>Phocoena phocoena</u>	-	Occasional/Extralimital	Mostly summer and early fall	California to Alaska	48,215
Narwhal	<u>Monodon monoceros</u>	-				45,358
Mysticetes						
Bowhead whale	<u>Balaena mysticetus</u>	Endangered; Depleted	Common	Mostly spring and fall with some in summer	Russia to Canada	16,892
Gray whale	<u>Eschrichtius robustus</u>	-	Somewhat common	Mostly summer	Mexico to the U.S. Arctic Ocean	19,126
Minke whale	<u>Balaenoptera acutorostrata</u>	-				810-1,003
Humpback whale (Central North Pacific stock)	<u>Megaptera novaeangliae</u>	Endangered; Depleted				21,063
Pinnipeds						
Bearded seal (Beringia distinct population segment)	<u>Erigathus barbatus</u>	Threatened; Depleted	Common	Spring and summer	Bering, Chukchi, and Beaufort Seas	155,000
Ringed seal (Arctic stock)	<u>Phoca hispida</u>	Threatened; Depleted	Common	Year round	Bering, Chukchi, and Beaufort Seas	300,000
Spotted seal	<u>Phoca largha</u>	-	Common	Summer	Japan to U.S. Arctic Ocean	141,479
Ribbon seal	<u>Histiophoca fasciata</u>	Species of concern	Occasional	Summer	Russia to U.S. Arctic Ocean	49,000

Endangered, threatened, or species of concern under the Endangered Species Act (ESA); Depleted under the MMPA

The highlighted (grayed out) species in Table 1 are so rarely sighted in the central Alaskan Beaufort Sea that their presence in the proposed project area, and therefore take, is unlikely. Minke whales are relatively common in the Bering and southern Chukchi seas and have recently also been sighted in the northeastern Chukchi Sea (Aerts et al., 2013; Clarke et al.,

2013). Minke whales are rare in the Beaufort Sea. They have not been reported in the Beaufort Sea during the Bowhead Whale Aerial Survey Project/Aerial Surveys of Arctic Marine Mammals (BWASP/ASAMM) surveys (Clarke et al., 2011, 2012; 2013; Monnet and Treacy, 2005), and there was only one observation in 2007 during vessel-based surveys in the region (Funk et al., 2010). Humpback whales have not generally been found in the Arctic Ocean. However, subsistence hunters have spotted humpback whales in low numbers around Barrow, and there have been several confirmed sightings of humpback whales in the northeastern Chukchi Sea in recent years (Aerts et al., 2013; Clarke et al., 2013). The first confirmed sighting of a humpback whale in the Beaufort Sea was recorded in August 2007 (Hashagen et al., 2009) when a cow and calf were observed 54 mi east of Point Barrow. No additional sightings have been documented in the Beaufort Sea. Narwhal are common in the waters of northern Canada, west Greenland, and in the European Arctic, but rarely occur in the Beaufort Sea (COSEWIC, 2004). Only a handful of sightings have occurred in Alaskan waters (Allen and Angliss, 2013). These three species are not considered further in this IHA notice. Both the walrus and the polar bear could occur in the U.S. Beaufort Sea; however, these species are managed by the U.S. Fish and Wildlife Service (USFWS) and are not considered further in this IHA.

The Beaufort Sea is a main corridor of the bowhead whale migration route. The main migration periods occur in spring from April to June and in fall from late August/early September through October to early November. During the fall migration, several locations in the U.S. Beaufort Sea serve as feeding grounds for bowhead whales. Small numbers of bowhead whales that remain in the U.S. Arctic Ocean during summer also feed in these areas. The U.S. Beaufort Sea is not a main feeding or calving area for any other cetacean species. Ringed seals breed and pup in the Beaufort Sea; however, this does not occur during the summer or early fall.

Further information on the biology and local distribution of these species can be found in BP's application (see ADDRESSES) and the NMFS Marine Mammal Stock Assessment Reports, which are available online at: <http://www.nmfs.noaa.gov/pr/species/>.

Potential Effects of the Specified Activity on Marine Mammals

This section includes a summary and discussion of the ways that the types of stressors associated with the specified activity (e.g., seismic airgun, sidescan sonar, subbottom profiler, vessel movement) have been observed to or are thought to impact marine mammals. This section may include a discussion of known effects that do not rise to the level of an MMPA take (for example, with acoustics, we may include a discussion of studies that showed animals not reacting at all to sound or exhibiting barely measurable avoidance). The discussion may also include reactions that we consider to rise to the level of a take and those that we do not consider to rise to the level of a take. This section is intended as a background of potential effects and does not consider either the specific manner in which this activity will be carried out or the mitigation that will be implemented or how either of those will shape the anticipated impacts from this specific activity. The "Estimated Take by Incidental Harassment" section later in this document will include a quantitative analysis of the number of individuals that are expected to be taken by this activity. The "Negligible Impact Analysis" section will include the analysis of how this specific activity will impact marine mammals and will consider the content of this section, the "Estimated Take by Incidental Harassment" section, the "Mitigation" section, and the "Anticipated Effects on Marine Mammal Habitat" section to draw conclusions regarding the likely impacts of this activity on the reproductive success or survivorship of individuals and from that on the affected marine mammal populations or stocks.

Operating active acoustic sources, such as airgun arrays, has the potential for adverse

effects on marine mammals. The majority of anticipated impacts would be from the use of acoustic sources.

The effects of sound from airgun pulses might include one or more of the following: tolerance, masking of natural sounds, behavioral disturbance, and temporary or permanent hearing impairment or non-auditory effects (Richardson et al., 1995). However, for reasons discussed in the proposed IHA, it is unlikely that there would be any cases of temporary, or especially permanent, hearing impairment resulting from BP's activities. As outlined in previous NMFS documents, the effects of noise on marine mammals are highly variable, often depending on species and contextual factors (based on Richardson et al., 1995).

In the "Potential Effects of the Specified Activity on Marine Mammals" section of the Notice of Proposed IHA (79 FR 21522, April 16, 2014), NMFS included a qualitative discussion of the different ways that BP's 2014 shallow geohazard survey program may potentially affect marine mammals. The discussion focused on information and data regarding potential acoustic and non-acoustic effects from survey activities (i.e., use of airguns, sonar systems, and aircraft). Marine mammals may experience masking and behavioral disturbance. The information contained in the "Potential Effects of Specified Activities on Marine Mammals" section from the proposed IHA has not changed. Please refer to the proposed IHA for the full discussion (79 FR 21522, April 16, 2014). A short summary is provided here.

Marine mammals may behaviorally react when exposed to anthropogenic sound. These behavioral reactions are often shown as: changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas

where sound sources are located; and/or flight responses (e.g., pinnipeds flushing into water from haulouts or rookeries).

Masking is the obscuring of sounds of interest by other sounds, often at similar frequencies. Marine mammals use acoustic signals for a variety of purposes, which differ among species, but include communication between individuals, navigation, foraging, reproduction, avoiding predators, and learning about their environment (Erbe and Farmer, 2000; Tyack, 2000). Masking, or auditory interference, generally occurs when sounds in the environment are louder than, and of a similar frequency as, auditory signals an animal is trying to receive. Masking is a phenomenon that affects animals that are trying to receive acoustic information about their environment, including sounds from other members of their species, predators, prey, and sounds that allow them to orient in their environment. Masking these acoustic signals can disturb the behavior of individual animals, groups of animals, or entire populations. For the airgun sound generated from the proposed survey, sound will consist of low frequency (under 500 Hz) pulses with extremely short durations (less than one second). There is little concern regarding masking near the sound source due to the brief duration of these pulses and relatively longer silence between airgun shots (approximately 3-4 seconds). Masking from airguns is more likely in low-frequency marine mammals like mysticetes (which are not expected to occur in high numbers in the survey area in July and August). It is less likely for mid- to high-frequency cetaceans and pinnipeds.

Hearing impairment (either temporary or permanent) is unlikely. Given the higher level of sound necessary to cause permanent threshold shift as compared with temporary threshold shift, it is considerably less likely that permanent threshold shift would occur during the survey in Foggy Island Bay. Cetaceans generally avoid the immediate area around operating seismic

vessels, as do some other marine mammals. Some pinnipeds show avoidance reactions to airguns, but their avoidance reactions are generally not as strong or consistent as those of cetaceans, and occasionally they seem to be attracted to operating seismic vessels (NMFS, 2010).

Serious injury or mortality is not anticipated from use of the equipment. To date, there is no evidence that serious injury, death, or stranding by marine mammals can occur from exposure to airgun pulses, even in the case of large airgun arrays. Additionally, BP's project will use an extremely small-sized airgun array in shallow water. NMFS does not expect any marine mammals will incur serious injury or mortality in the shallow waters of Foggy Island Bay or strand as a result of the proposed geohazard survey.

Active acoustic sources other than airguns (i.e., sonar systems) are proposed for BP's 2014 shallow geohazard survey in Foggy Island Bay, Beaufort Sea, Alaska. The multibeam echosounder does not produce frequencies within the hearing range of marine mammals. Exposure to sounds generated by this instrument, therefore, does not present a risk of potential physiological damage, hearing impairment, and/or behavioral responses.

The sidescan sonar does not produce frequencies within the hearing range of mysticetes and ice seals, but when operating at 110-135 kHz could be audible by mid- and high-frequency cetaceans, depending on the strength of the signal. However, when it operates at the much higher frequencies greater than 400 kHz, it is outside of the hearing range of all marine mammals. Masking is unlikely to occur due to the nature of the signal and because beluga whales and ice seals generally vocalize at frequencies lower than 100 kHz. Any behavioral reactions are anticipated to be short-term and temporary in nature. No hearing impairment or death is anticipated from use of this equipment.

Subbottom profilers will be audible to all three hearing classes of marine mammals that

occur in the project area. Based on previous measurements of various subbottom profilers, the rms sound pressure level does not reach 180 dB re 1 μ Pa (Funk et al., 2008; Ireland et al., 2009; Warner and McCrodon, 2011). Masking is unlikely due to the low duty cycle, directionality, and brief period when an individual mammal is likely to be within the beam. Additionally, the higher frequencies of the instrument are unlikely to overlap with the lower frequency calls by mysticetes. Some stranding events of mid-frequency cetaceans were attributed to the presence of sonar surveys in the area (e.g., Southall et al., 2006). Recently, an independent scientific review panel concluded that the mass stranding of approximately 100 melon-headed whales in northwest Madagascar in 2008 was primarily triggered by a multibeam echosounder system (Southall et al., 2013), acknowledging that it was difficult to find evidence showing a direct cause-effect relationships. The multibeam echosounder proposed in this survey will operate at much higher frequencies, outside the hearing range of any marine mammal. The sidescan sonar and subbottom profiler are much less powerful. Considering the acoustic specifics of these instruments, the shallow water environment, the unlikely presence of toothed whales in the area, and planned mitigation measures, no marine mammal stranding or mortality are expected.

Vessel activity and noise associated with vessel activity will temporarily increase in the action area during BP's survey as a result of the operation of one vessel. To minimize the effects of the vessel and noise associated with vessel activity, BP will alter speed if a marine mammal gets too close to a vessel. In addition, the vessel will be operating at slow speed (3-4 knots) when conducting surveys. Marine mammal monitoring observers will alert the vessel captain as animals are detected to ensure safe and effective measures are applied to avoid coming into direct contact with marine mammals. Therefore, NMFS neither anticipates nor authorizes takes of marine mammals from ship strikes.

Anticipated Effects on Marine Mammal Habitat

The primary potential impacts to marine mammal habitat and other marine species are associated with elevated sound levels produced by airguns and other active acoustic sources. The proposed IHA contains a full discussion of the potential impacts to marine mammal habitat and prey species in the project area. No changes have been made to that discussion. Please refer to the proposed IHA for the full discussion of potential impacts to marine mammal habitat (79 FR 21522, April 16, 2014). NMFS has determined that BP's shallow geohazard survey program is not expected to have any habitat-related effects that could cause significant or long-term consequences for individual marine mammals or their populations.

Mitigation

In order to issue an incidental take authorization (ITA) under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses (where relevant). This section summarizes the required mitigation measures contained in the IHA.

Mitigation Measures in BP's Application

BP described general mitigation measures that apply throughout the survey and specific mitigation measures that apply to airgun operations. The protocols are discussed next and can also be found in Section 11 of BP's application (see ADDRESSES).

1. General Mitigation Measures

These general mitigation measures apply at all times to the vessel involved in the Liberty geohazard survey. This vessel would also operate under an additional set of specific mitigation

measures during airgun operations (described a bit later in this document).

The general mitigation measures include: (1) adjusting speed to avoid collisions with whales and during periods of low visibility; (2) checking the waters immediately adjacent to the vessel to ensure that no marine mammals will be injured when the vessel's propellers (or screws) are engaged; (3) avoiding concentrations of groups of whales and not operating vessels in a way that separates members of a group; (4) reducing vessel speeds to less than 10 knots in the presence of feeding whales; (5) reducing speed and steering around groups of whales if circumstances allow (but never cutting off a whale's travel path) and avoiding multiple changes in direction and speed when within 900 ft of whales; (6) maintaining an altitude of at least 1,000 ft when flying helicopters, except in emergency situations or during take-offs and landings; and (7) not hovering or circling with helicopters above or within 0.3 mi of groups of whales.

2. Seismic Airgun Mitigation Measures

BP will establish and monitor Level A harassment exclusion zones for all marine mammal species. These zones will be monitored by PSOs (more detail later). Should marine mammals enter these exclusion zones, the PSOs will call for and implement the suite of mitigation measures described next.

Ramp-up Procedure: Ramp-up procedures of an airgun array involve a step-wise increase in the number of operating airguns until the required discharge volume is achieved. The purpose of a ramp-up (sometimes referred to as "soft-start") is to provide marine mammals in the vicinity of the activity the opportunity to leave the area and to avoid the potential for injury or impairment of their hearing abilities.

During ramp-up, BP will implement the common procedure of doubling the number of operating airguns at 5-minute intervals, starting with the smallest gun in the array. Ramp-up of

the 30 in³ array from a shutdown will therefore take 10 min for the three-airgun array option and 5 min for the two-airgun array option. First the smallest gun in the array will be activated (10 in³) and after 5 min, the second airgun (10 in³ or 20 in³). For the three-airgun array, an additional 5 min are then required to activate the third 10 in³ airgun. During ramp-up, the exclusion zone for the full airgun array will be observed. The ramp-up procedures will be applied as follows:

1. A ramp-up, following a cold start, can be applied if the exclusion zone has been free of marine mammals for a consecutive 30-minute period. The entire exclusion zone must have been visible during these 30 minutes. If the entire exclusion zone is not visible, then ramp-up from a cold start cannot begin.

2. Ramp-up procedures from a cold start will be delayed if a marine mammal is sighted within the exclusion zone during the 30-minute period prior to the ramp-up. The delay will last until the marine mammal(s) has been observed to leave the exclusion zone or until the animal(s) is not sighted for at least 15 minutes (seals) or 30 minutes (cetaceans).

3. A ramp-up, following a shutdown, can be applied if the marine mammal(s) for which the shutdown occurred has been observed to leave the exclusion zone or until the animal(s) has not been sighted for at least 15 minutes (seals) or 30 minutes (cetaceans). This assumes there was a continuous observation effort prior to the shutdown and the entire exclusion zone is visible.

4. If, for any reason, power to the airgun array has been discontinued for a period of 10 minutes or more, ramp-up procedures need to be implemented. Only if the PSO watch has been suspended, a 30-minute clearance of the exclusion zone is required prior to commencing ramp-up. Discontinuation of airgun activity for less than 10 minutes does not require a ramp-up.

5. The seismic operator and PSOs will maintain records of the times when ramp-ups start and when the airgun arrays reach full power.

Power Down Procedure: A power down is the immediate reduction in the number of operating airguns such that the radii of the 190 dB and 180 dB (rms) zones are decreased to the extent that an observed marine mammal is not in the applicable exclusion zone of the full array. For this geohazard survey, the operation of one airgun continues during a power down. The continued operation of one airgun is intended to (a) alert marine mammals to the presence of airgun activity, and (b) retain the option of initiating a ramp up to full operations under poor visibility conditions.

1. The array will be immediately powered down whenever a marine mammal is sighted approaching close to or within the applicable exclusion zone of the full array, but is outside the applicable exclusion zone of the single airgun;

2. Likewise, if a mammal is already within the exclusion zone of the full array when first detected, the airgun array will be powered down to one operating gun immediately;

3. If a marine mammal is sighted within or about to enter the applicable exclusion zone of the single airgun, it too will be shut down; and

4. Following a power down, ramp-up to the full airgun array will not resume until the marine mammal has cleared the applicable exclusion zone. The animal will be considered to have cleared the exclusion zone if it has been visually observed leaving the exclusion zone of the full array, or has not been seen within the zone for 15 minutes (seals) or 30 minutes (cetaceans).

Shut-down Procedures: The operating airgun(s) will be shut down completely if a marine mammal approaches or enters the 190 or 180 dB (rms) exclusion radius of the smallest airgun. Airgun activity will not resume until the marine mammal has cleared the applicable exclusion

radius of the full array. The animal will be considered to have cleared the exclusion radius as described above under ramp-up procedures.

Poor Visibility Conditions: BP plans to conduct 24-hr operations. PSOs will not be on duty during ongoing seismic operations during darkness, given the very limited effectiveness of visual observation at night (there will be no periods of darkness in the survey area until mid-August). The provisions associated with operations at night or in periods of poor visibility include the following:

- If during foggy conditions, heavy snow or rain, or darkness (which may be encountered starting in late August), the full 180 dB exclusion zone is not visible, the airguns cannot commence a ramp-up procedure from a full shut-down; and
- If one or more airguns have been operational before nightfall or before the onset of poor visibility conditions, they can remain operational throughout the night or poor visibility conditions. In this case ramp-up procedures can be initiated, even though the exclusion zone may not be visible, on the assumption that marine mammals will be alerted by the sounds from the single airgun and have moved away.

BP is aware that available techniques to more effectively detect marine mammals during limited visibility conditions (darkness, fog, snow, and rain) are in need of development and has in recent years supported research and field trials intended to improve methods of detecting marine mammals under these conditions.

Additional Mitigation Measures Required by NMFS

The mitigation airgun will be operated at approximately one shot per minute and will not be operated for longer than three hours in duration during daylight hours and good visibility. In cases when the next start-up after the turn is expected to be during lowlight or low visibility, use

of the mitigation airgun may be initiated 30 minutes before darkness or low visibility conditions occur and may be operated until the start of the next seismic acquisition line. The mitigation gun must still be operated at approximately one shot per minute.

NMFS clarified or refined some of the mitigation measures contained in BP's application (and listed earlier in this section). In low visibility conditions, NMFS requires BP to reduce speeds to 9 knots or less. Separately, NMFS has defined a group or concentration of whales as five or more individuals.

Mitigation Conclusions

NMFS has carefully evaluated BP's mitigation measures and considered a range of other measures in the context of ensuring that NMFS prescribes the means of effecting the least practicable impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another:

- The manner in which, and the degree to which, the successful implementation of the measures are expected to minimize adverse impacts to marine mammals;
- The proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and
- The practicability of the measure for applicant implementation.

Based on our evaluation of the applicant's proposed measures, as well as other measures considered by NMFS and those recommended by the public, NMFS has determined that the required mitigation measures provide the means of effecting the least practicable impact on marine mammals species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance. Measures to ensure availability of such

species or stock for taking for certain subsistence uses are discussed later in this document (see “Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses” section).

Monitoring and Reporting

In order to issue an ITA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth “requirements pertaining to the monitoring and reporting of such taking”. The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for ITAs must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area. BP submitted information regarding marine mammal monitoring to be conducted during seismic operations as part of the IHA application. That information can be found in Sections 11 and 13 of the application.

Monitoring Measures

1. Visual Monitoring

Two observers referred to as PSOs will be present on the vessel. Of these two PSOs, one will be on watch at all times to monitor the 190 and 180 dB exclusion zones for the presence of marine mammals during airgun operations. The main objectives of the vessel-based marine mammal monitoring are as follows: (1) To implement mitigation measures during seismic operations (e.g. course alteration, airgun power down, shut-down and ramp-up); and (2) To record all marine mammal data needed to estimate the number of marine mammals potentially affected, which must be reported to NMFS within 90 days after the survey.

BP intends to work with experienced PSOs. At least one Alaska Native resident, who is knowledgeable about Arctic marine mammals and the subsistence hunt, is expected to be

included as one of the team members aboard the vessel. Before the start of the survey, the vessel crew will be briefed on the function of the PSOs, their monitoring protocol, and mitigation measures to be implemented.

At least one observer will monitor for marine mammals at any time during daylight hours (there will be no periods of total darkness until mid-August). PSOs will be on duty in shifts of a maximum of 4 hours at a time, although the exact shift schedule will be established by the lead PSO in consultation with the other PSOs. In response to a public comment, language has been included in the IHA to clarify that the on-duty PSO must monitor for marine mammals 30 minutes before, during, and 30 minutes after the use of the seismic airguns and other active sound sources.

The vessel will offer a suitable platform for marine mammal observations. Observations will be made from locations where PSOs have the best view around the vessel. During daytime, the PSO(s) will scan the area around the vessel systematically with reticle binoculars and with the naked eye. Because the main purpose of the PSO on board the vessel is detecting marine mammals for the implementation of mitigation measures according to specific guidelines, BP prefers (and NMFS agrees) to keep the information to be recorded as concise as possible, allowing the PSO to focus on detecting marine mammals. The following information will be collected by the PSOs:

- Environmental conditions – consisting of sea state (in Beaufort Wind force scale according to NOAA), visibility (in km, with 10 km indicating the horizon on a clear day), and sun glare (position and severity). These will be recorded at the start of each shift, whenever there is an obvious change in one or more of the environmental variables, and whenever the observer changes shifts;

- Project activity – consisting of airgun operations (on or off), number of active guns, line number. This will be recorded at the start of each shift, whenever there is an obvious change in project activity, and whenever the observer changes shifts; and

- Sighting information – consisting of the species (if determinable), group size, position and heading relative to the vessel, behavior, movement, and distance relative to the vessel (initial and closest approach). These will be recorded upon sighting a marine mammal or group of animals.

When marine mammals in the water are detected within or about to enter the designated exclusion zones, the airgun(s) power down or shut-down procedures will be implemented immediately. To assure prompt implementation of power downs and shut-downs, multiple channels of communication between the PSOs and the airgun technicians will be established. During the power down and shut-down, the PSO(s) will continue to maintain watch to determine when the animal(s) are outside the exclusion radius. Airgun operations can resume with a ramp-up procedure (depending on the extent of the power down) if the observers have visually confirmed that the animal(s) moved outside the exclusion zone, or if the animal(s) were not observed within the exclusion zone for 15 minutes (seals) or for 30 minutes (cetaceans). Direct communication with the airgun operator will be maintained throughout these procedures.

All marine mammal observations and any airgun power down, shut-down, and ramp-up will be recorded in a standardized format. Data will be entered into or transferred to a custom database. The accuracy of the data entry will be verified daily through QA/QC procedures. Recording procedures will allow initial summaries of data to be prepared during and shortly after the field program, and will facilitate transfer of the data to other programs for further processing and archiving.

2. Fish and Airgun Sound Monitoring

BP proposes to conduct research on fish species in relation to airgun operations, including prey species important to ice seals, during the proposed seismic survey. The Liberty shallow geohazard survey, along with another seismic survey BP is conducting this summer in Prudhoe Bay, offers a unique opportunity to assess the impacts of airgun sounds on fish, specifically on changes in fish abundance in fyke nets that have been sampled in the area for more than 30 years. The monitoring study would occur over a 2-month period during the open-water season. During this time, fish are counted and sized every day, unless sampling is prevented by weather, the presence of bears, or other events. Fish mortality is also noted.

The fish-sampling period coincides with the shallow geohazard survey, resulting in a situation where each of the four fyke nets will be exposed to varying daily exposures to airgun sounds. That is, as source vessels move back and forth across the project area, fish caught in nets will be exposed to different sounds levels at different nets each day. To document relationships between fish catch in each fyke net and received sound levels, BP will attempt to instrument each fyke net location with a recording hydrophone. Recording hydrophones, to the extent possible, will have a dynamic range that extends low enough to record near ambient sounds and high enough to capture sound levels during relatively close approaches by the airgun array (i.e., likely levels as high as about 200 dB re 1 uPa). Bandwidth will extend from about 10 Hz to at least 500 Hz. In addition, because some fish (especially salmonids) are likely to be sensitive to particle velocity instead of or in addition to sound pressure level, BP will attempt to instrument each fyke net location with a recording particle velocity meter. Acoustic and environmental data will be used in statistical models to assess relationships between acoustic and fish variables. Additional information on the details of the fish monitoring study can be found in

Section 13.1 of BP's application (see ADDRESSES).

Monitoring Plan Peer Review

The MMPA requires that monitoring plans be independently peer reviewed “where the proposed activity may affect the availability of a species or stock for taking for subsistence uses” (16 U.S.C. 1371(a)(5)(D)(ii)(III)). Regarding this requirement, NMFS’ implementing regulations state, “Upon receipt of a complete monitoring plan, and at its discretion, [NMFS] will either submit the plan to members of a peer review panel for review or within 60 days of receipt of the proposed monitoring plan, schedule a workshop to review the plan” (50 CFR 216.108(d)).

Because of the extremely short duration of BP's survey, the fact that activities will be completed prior to any fall bowhead whale subsistence hunts, and that seal hunts occur more than 50 mi from the survey activities, NMFS determined that the survey did not meet the trigger for requiring an independent peer review of the monitoring plan.

Reporting Measures

1. 90-Day Technical Report

A report will be submitted to NMFS within 90 days after the end of the shallow geohazard survey. The report will summarize all activities and monitoring results conducted during in-water seismic surveys. The Technical Report will include the following:

- Summary of project start and end dates, airgun activity, number of guns, and the number and circumstances of implementing ramp-up, power down, shutdown, and other mitigation actions;
- Summaries of monitoring effort (e.g., total hours, total distances, and marine mammal distribution through the study period, accounting for sea state and other factors affecting

visibility and detectability of marine mammals);

- Analyses of the effects of various factors influencing detectability of marine mammals (e.g., sea state, number of observers, and fog/glare);

- Species composition, occurrence, and distribution of marine mammal sightings, including date, water depth, numbers, age/size/gender categories (if determinable), and group sizes;

- Analyses of the effects of survey operations;

- Sighting rates of marine mammals during periods with and without seismic survey activities (and other variables that could affect detectability), such as: (i) initial sighting distances versus survey activity state; (ii) closest point of approach versus survey activity state; (iii) observed behaviors and types of movements versus survey activity state; (iv) numbers of sightings/individuals seen versus survey activity state; (v) distribution around the source vessels versus survey activity state; and (vi) estimates of exposures of marine mammals to Level B harassment thresholds based on presence in the 160 dB harassment zone.

2. Fish and Airgun Sound Report

BP will present the results of the fish and airgun sound study to NMFS in a detailed report. BP proposes to also submit that report to a peer reviewed journal for publication and present the results at a scientific conference and in Barrow and Nuiqsut.

3. Notification of Injured or Dead Marine Mammals

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA, such as an injury (Level A harassment), serious injury or mortality (e.g., ship-strike, gear interaction, and/or entanglement), BP would immediately cease the specified activities and immediately report the incident to the Chief of the

Permits and Conservation Division, Office of Protected Resources, NMFS, and the Alaska Regional Stranding Coordinators. The report would include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS would work with BP to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. BP would not be able to resume their activities until notified by NMFS via letter, email, or telephone.

In the event that BP discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), BP would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline and/or by email to the

Alaska Regional Stranding Coordinators. The report would include the same information identified in the paragraph above. Activities would be able to continue while NMFS reviews the circumstances of the incident. NMFS would work with BP to determine whether modifications in the activities are appropriate.

In the event that BP discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., carcass with moderate to advanced decomposition, or scavenger damage), BP would report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline and/or by email to the Alaska Regional Stranding Coordinators, within 24 hours of the discovery. BP would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. Activities may continue while NMFS reviews the circumstances of the incident.

Estimated Take by Incidental Harassment

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment]. Only take by Level B behavioral harassment of some species is anticipated as a result of the shallow geohazard survey. Anticipated impacts to marine mammals are associated with noise propagation from the sound sources (e.g., airguns, sidescan sonar, and subbottom profiler) used in the survey. No take is expected to result from

vessel strikes because of the slow speed of the vessel (3-4 knots while acquiring data) and because of mitigation measures to reduce collisions with marine mammals. Additionally, no take is expected to result from helicopter operations (if any occur) because of altitude restrictions. No take is expected from the multibeam echosounder and when the sidescan sonar is operated at frequencies above 400 kHz because the frequencies are outside the hearing ranges of marine mammals. Moreover, when the sidescan sonar is operated at frequencies of 110-135 kHz, it is outside the hearing ranges of low-frequency cetaceans and ice seals. Therefore, take has not been estimated from use of these sources for these species.

BP requested take of 11 marine mammal species by Level B harassment. However, for reasons mentioned earlier in this document, we have determined it is highly unlikely that humpback and minke whales would occur in the survey area. Therefore, NMFS has not authorized take of these two species. The species for which take, by Level B harassment only, is authorized include: bowhead, beluga, gray, and killer whales; harbor porpoise; and ringed, bearded, spotted, and ribbon seals.

The airguns and sub-bottom profiler produce impulsive sounds. The current acoustic thresholds used by NMFS to estimate Level B and Level A harassment are presented in Table 2.

Table 2. Current acoustic exposure criteria used by NMFS.

Criterion	Criterion Definition	Threshold
Level A Harassment (Injury)	Permanent Threshold Shift (PTS) (Any level above that which is known to cause TTS)	180 dB re 1 microPa-m (cetaceans) / 190 dB re 1 microPa-m (pinnipeds) root mean square (rms)
Level B Harassment	Behavioral Disruption (for impulse noises)	160 dB re 1 microPa-m (rms)
Level B Harassment	Behavioral Disruption (for continuous, noise)	120 dB re 1 microPa-m (rms)

Section 6 of BP's application contains a description of the methodology used by BP to estimate takes by harassment, including calculations for the 160 dB (rms) isopleth and marine

mammal densities in the areas of operation (see ADDRESSES), which was also provided in the proposed IHA notice (79 FR 21522, April 16, 2014). NMFS verified BP's methods, and used the density and sound isopleth measurements in estimating take. However, after initiating ESA section 7 consultation on this action, NMFS noticed that BP used the average distance to the 180 and 190 dB (rms) isopleths rounded to the nearest 100 or 10, respectively, but used the maximum distance to the 160 dB (rms) isopleth rounded to the nearest 100. This resulted in a 160 dB isopleth about 40% greater than the average expected distance of the isopleth. Table 7A in BP's application presented the average 160 dB isopleth as 944 m but calculated take assuming a 160 dB isopleth as 1,602 m. To remain consistent with the estimation of the other isopleths, NMFS has only rounded the average 160 dB isopleth for the 30 in³ array to 1,000 m. However, for reasons explained below this only changed the estimated take level for bowhead whales. Also, as noted later in this section, NMFS authorized the maximum number of estimated takes for all species, not just for cetaceans as presented by BP in order to ensure that exposure estimates are not underestimated for pinnipeds.

The shallow geohazard survey will take place in two phases and has an estimated duration of approximately 20 days, including 5 days between the two phases where operations will be focused on changing equipment. Data acquisition will conclude by the start of the Cross Island fall bowhead whale hunt.

During phase 1 of the project, 2D high resolution seismic data will be acquired in about 12 mi² of the Site Survey area. The duration is estimated at about 7.5 days, based on a continuous 24-hr operation and not including downtime.

During phase 2, data will be acquired in the Site Survey area (11 mi²) and over approximately 5 mi² of the 29 mi² Sonar Survey area using the multibeam echosounder, sidescan

sonar, subbottom profiler, and magnetometer. The total duration of Phase 2 is also expected to be 7.5 days, based on a continuous 24-hr operation and not including downtime.

Marine Mammal Density Estimates

The Notice of Proposed IHA (79 FR 21522, April 16, 2014) contained a complete description of the derivation of the marine mammal density estimates. That discussion has not changed and is therefore not repeated here.

Level A and Level B Harassment Zone Distances

For the proposed 2014 shallow geohazard survey, BP used existing sound source verification (SSV) measurements to establish distances to received sound pressure levels (SPLs). The Notice of Proposed IHA (79 FR 21522, April 16, 2014) contained a complete description of the derivation of the Level A and Level B harassment zone distances. With the exception of slightly altering the distances of the Level B harassment zone, as described above, nothing in the discussion has changed. Therefore, the entire discussion is not repeated here.

Table 3 in this document presents the radii used to estimate take (160 dB isopleth) and to implement mitigation measures (180 dB and 190 dB isopleths) from the full airgun array and the 5 in³ mitigation gun. However, take is only estimated using the larger radius of the full airgun array.

Table 3. Distances (in meters) to be used for estimating take by Level B harassment and for mitigation purposes during the proposed 2014 Foggy Island Bay shallow geohazard survey.

Airgun Discharge Volume (in³)	190 dB re 1 μPa	180 dB re 1 μPa	160 dB re 1 μPa
30 in ³	70	200	1,000
5 in ³	20	50	500

Numbers of Marine Mammals Potentially Taken by Harassment

The potential number of marine mammals that might be exposed to the 160 dB re 1 μ Pa (rms) SPL was calculated differently for cetaceans and pinnipeds, as described in Section 6.3 of

BP's application and the Notice of Proposed IHA (79 FR 21522, April 16, 2014). The change to the 160 dB isopleth for the full array only had implications for the take estimate for bowhead whales. Because of the method used to calculate takes for pinnipeds, the isopleth change did not change the pinniped takes described in those earlier documents. Additionally, the change did not alter the proposed take estimates for other cetacean species. Therefore, those discussions are not repeated here.

BP did not calculate take from the subbottom profiler or from the sidescan sonar for toothed whales. Based on the distance to the 160 dB re 1 μ Pa (rms) isopleths for these sources and the fact that NMFS has authorized the maximum estimated exposure estimate, the extremely minimal number of exposures (less than one animal for each species) that would result from use of these sources is already accounted for in the airgun exposure estimates.

1. Number of Cetaceans Potentially Taken by Harassment

The potential number of bowhead whales that might be exposed to the 160 dB re 1 μ Pa (rms) SPL was calculated by multiplying:

- The expected bowhead density as provided in Table 5 in BP's application;
- The anticipated area around each source vessel that is ensonified by the 160 dB re 1 μ Pa (rms) SPL; and
- The estimated number of 24-hr days that the source vessels are operating.

The area expected to be ensonified by the 30 in³ array was determined based on the average distance to the 160 dB re 1 μ Pa (rms) SPL rounded to the nearest 100 as determined from the maximum 20-40 in³ array measurements (Table 7A in BP's application), which is 1 km. Based on a radius of 1 km, the 160 dB ensonified area used in the exposure calculations was 3.14 km².

The estimated number of 24-hr days of airgun operations is 7.5 days (180 hours), not including downtime. Downtime is related to weather, equipment maintenance, mitigation implementation, and other circumstances.

Based on this revision to the 160 dB isopleth, the average and maximum number of bowhead whales potentially exposed to sound levels of 160 dB re 1 μ Pa (rms) or more is estimated at 0.04 and 0.13, respectively. Because a fraction of an exposure is impossible, we rounded up the maximum estimate to account for one bowhead whale exposure to the Level B harassment threshold. These estimated exposures do not take into account the required mitigation measures, such as PSOs watching for animals, shutdowns or power downs of the airguns when marine mammals are seen within defined ranges, and ramp-up of airguns.

Estimated Take by Harassment Summary

Table 4 here outlines the density estimates used to estimate Level B takes, the authorized Level B harassment take levels, the abundance of each species in the Beaufort Sea, the percentage of each species or stock estimated to be taken, and current population trends. As explained earlier in this document, NMFS authorized the maximum estimates of exposures. Additionally, density estimates are not available for species that are uncommon in the proposed survey area.

Table 4. Density estimates or species sighting rates, authorized Level B harassment take levels, species or stock abundance, percentage of population proposed to be taken, and species trend status.

Species	Density (#/km ²)	Sighting Rate (ind/hr)	Authorized Level B Take	Abundance	Percentage of Population	Trend
Beluga whale	0.0105	-	75	39,258	0.19	No reliable information
Killer whale	NA	-	1	552	0.18	Stable
Harbor porpoise	NA	-	1	48,215	>0.01	No reliable information
Bowhead whale	0.0055	-	1	16,892	0.01	Increasing
Gray whale	NA	-	1	19,126	0.01	Increasing
Bearded seal	-	0.107	19	155,000	0.01	No reliable

						information
Ringed seal	-	0.397	71	300,000	0.02	No reliable information
Spotted seal	-	0.126	23	141,479	0.02	No reliable information
Ribbon seal	-	NA	1	49,000	>0.01	No reliable information

Analysis and Determinations

Negligible Impact

Negligible impact is “an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival” (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (i.e., population-level effects). An estimate of the number of Level B harassment takes, alone, is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be “taken” through behavioral harassment, NMFS must consider other factors, such as the likely nature of any responses (their intensity, duration, etc.), the context of any responses (critical reproductive time or location, migration, etc.), as well as the number and nature of estimated Level A harassment takes, the number of estimated mortalities, effects on habitat, and the status of the species.

No injuries or mortalities are anticipated to occur as a result of BP’s shallow geohazard survey, and none are authorized. Additionally, animals in the area are not expected to incur hearing impairment or non-auditory physiological effects. The number of takes that are anticipated and authorized are expected to be limited to short-term Level B behavioral harassment. While the airguns will be operated continuously for about 7.5 days, the project time frame will occur when cetacean species are typically not found in the project area or are found only in low numbers. While pinnipeds are likely to be found in the project area more frequently,

their distribution is dispersed enough that they likely will not be in the Level B harassment zone continuously. As mentioned previously, pinnipeds appear to be more tolerant of anthropogenic sound than mysticetes. The use of sidescan sonar, multibeam echosounder, and subbottom profiler continuously for 7.5 days will not negatively impact marine mammals as the majority of these instruments are operated outside of the hearing frequencies of marine mammals.

The Alaskan Beaufort Sea is part of the main migration route of the Western Arctic stock of bowhead whales. However, the geohazard survey has been planned to occur when the majority of the population is found in the Canadian Beaufort Sea. Operation of airguns and other sound sources will conclude by midnight on August 25 before the main fall migration begins and well before cow/calf pairs begin migrating through the area. Additionally, several locations within the Beaufort Sea serve as feeding grounds for bowhead whales. However, as mentioned earlier in this document, the primary feeding grounds are not found in Foggy Island Bay. The majority of bowhead whales feed in the Alaskan Beaufort Sea during the fall migration period, which will occur after the cessation of the survey.

Belugas that migrate through the U.S. Beaufort Sea typically do so farther offshore (more than 37 mi [60 km]) and in deeper waters (more than 656 ft [200 m]) than where the survey activities would occur. Gray whales are rarely sighted this far east in the U.S. Beaufort Sea. Additionally, there are no known feeding grounds for gray whales in the Foggy Island Bay area. The most northern feeding sites known for this species are located in the Chukchi Sea. The other cetacean species for which take is authorized are uncommon in Foggy Island Bay, and no known feeding or calving grounds occur in Foggy Island Bay for these species. Based on these factors, exposures of cetaceans to anthropogenic sounds are not expected to last for prolonged periods (i.e., several days) since they are not known to remain in the area for extended periods of time in

July and August. Also, the shallow water location of the survey makes it unlikely that cetaceans would remain in the area for prolonged periods. Based on all of this information, the survey is not anticipated to affect annual rates of recruitment or survival for cetaceans in the area.

Ringed seals breed and pup in the Alaskan Beaufort Sea; however, the survey will occur outside of the breeding and pupping seasons. The Beaufort Sea does not provide suitable habitat for the other three ice seal species for breeding and pupping. Based on this information, the survey is not anticipated to affect annual rates of recruitment or survival for pinnipeds in the area.

Of the nine marine mammal species for which take is authorized, one is listed as endangered under the ESA--the bowhead whale—and two are listed as threatened—ringed and bearded seals. Schweder et al. (2009) estimated the yearly growth rate for bowhead whales to be 3.2% (95% CI = 0.5-4.8%) between 1984 and 2003 using a sight-resight analysis of aerial photographs. There are currently no reliable data on trends of the ringed and bearded seal stocks in Alaska. The ribbon seal is listed as a species of concern under the ESA. Certain stocks or populations of gray, killer, and beluga whales and spotted seals are listed as endangered or are proposed for listing under the ESA; however, none of those stocks or populations occur in the activity area. There is currently no established critical habitat in the project area for any of these nine species.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the required monitoring and mitigation measures, NMFS finds that the total marine mammal take from BP's shallow geohazard survey in Foggy Island Bay, Beaufort Sea, Alaska, will have a negligible impact on the affected marine mammal species or stocks.

Small Numbers

The requested takes authorized represent less than 1% of all populations or stocks (see Table 4 in this document). These take estimates represent the percentage of each species or stock that could be taken by Level B behavioral harassment if each animal is taken only once. The numbers of marine mammals taken are small relative to the affected species or stock sizes. In addition, the mitigation and monitoring measures (described previously in this document) required in the IHA are expected to reduce even further any potential disturbance to marine mammals. NMFS finds that small numbers of marine mammals will be taken relative to the populations of the affected species or stocks.

Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses

Relevant Subsistence Uses

The disturbance and potential displacement of marine mammals by sounds from the survey are the principal concerns related to subsistence use of the area. Subsistence remains the basis for Alaska Native culture and community. Marine mammals are legally hunted in Alaskan waters by coastal Alaska Natives. In rural Alaska, subsistence activities are often central to many aspects of human existence, including patterns of family life, artistic expression, and community religious and celebratory activities. Additionally, the animals taken for subsistence provide a significant portion of the food that will last the community throughout the year. The main species that are hunted include bowhead and beluga whales, ringed, spotted, and bearded seals, walruses, and polar bears. (As mentioned previously in this document, both the walrus and the polar bear are under the USFWS' jurisdiction.) The importance of each of these species varies among the communities and is largely based on availability.

Residents of the village of Nuiqsut are the primary subsistence users in the project area.

The communities of Barrow and Kaktovik also harvest resources that pass through the area of interest but do not hunt in or near the Foggy Island Bay area. Subsistence hunters from all three communities conduct an annual hunt for autumn-migrating bowhead whales. Barrow also conducts a bowhead hunt in spring. Residents of all three communities hunt seals. Other subsistence activities include fishing, waterfowl and seaduck harvests, and hunting for walrus, beluga whales, polar bears, caribou, and moose.

Nuiqsut is the community closest to the survey area (approximately 73 mi [117.5 km] southwest). Nuiqsut hunters harvest bowhead whales only during the fall whaling season (Long, 1996). In recent years, Nuiqsut whalers have typically landed three or four whales per year. Nuiqsut whalers concentrate their efforts on areas north and east of Cross Island, generally in water depths greater than 66 ft (20 m; Galginaitis, 2009). Cross Island is the principal base for Nuiqsut whalers while they are hunting bowheads (Long, 1996). Cross Island is located approximately 10 mi (16 km) from the closest boundary of the survey area.

Kaktovik whalers search for whales east, north, and occasionally west of Kaktovik. Kaktovik is located approximately 91 mi (146.5 km) east of Foggy Island Bay. The western most reported harvest location was about 13 mi (21 km) west of Kaktovik, near 70°10' N., 144°11' W. (Kaleak, 1996). That site is about 80 mi (129 km) east of the proposed survey area.

Barrow whalers search for whales much farther from the Foggy Island Bay area—about 200+ mi (322+ km) to the west. Barrow hunters have expressed concerns about “downstream” effects to bowhead whales during the westward fall migration; however, BP will cease airgun operations prior to the start of the fall migration.

Beluga whales are not a prevailing subsistence resource in the communities of Kaktovik and Nuiqsut. Kaktovik hunters may harvest one beluga whale in conjunction with the bowhead

hunt; however, it appears that most households obtain beluga through exchanges with other communities. Although Nuiqsut hunters have not hunted belugas for many years while on Cross Island for the fall hunt, this does not mean that they may not return to this practice in the future. Data presented by Braund and Kruse (2009) indicate that only 1% of Barrow's total harvest between 1962 and 1982 was of beluga whales and that it did not account for any of the harvested animals between 1987 and 1989.

Ringed seals are available to subsistence users in the Beaufort Sea year-round, but they are primarily hunted in the winter or spring due to the rich availability of other mammals in the summer. Bearded seals are primarily hunted during July in the Beaufort Sea; however, in 2007, bearded seals were harvested in the months of August and September at the mouth of the Colville River Delta, which is approximately 50+ mi (80+ km) from the proposed survey area. However, this sealing area can reach as far east as Pingok Island, which is approximately 20 mi (32 km) west of the survey area. An annual bearded seal harvest occurs in the vicinity of Thetis Island (which is a considerable distance from Foggy Island Bay) in July through August. Approximately 20 bearded seals are harvested annually through this hunt. Spotted seals are harvested by some of the villages in the summer months. Nuiqsut hunters typically hunt spotted seals in the nearshore waters off the Colville River Delta. The majority of the more established seal hunts that occur in the Beaufort Sea, such as the Colville delta area hunts, are located a significant distance (in some instances 50 mi [80 km] or more) from the project area.

Potential Impacts to Subsistence Uses

NMFS has defined "unmitigable adverse impact" in 50 CFR 216.103 as: "...an impact resulting from the specified activity: (1) That is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by: (i) Causing the marine mammals

to abandon or avoid hunting areas; (ii) Directly displacing subsistence users; or (iii) Placing physical barriers between the marine mammals and the subsistence hunters; and (2) That cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.”

Noise and general activity during BP’s shallow geohazard survey have the potential to impact marine mammals hunted by Native Alaskan. In the case of cetaceans, the most common reaction to anthropogenic sounds (as noted previously) is avoidance of the ensonified area. In the case of bowhead whales, this often means that the animals divert from their normal migratory path by several kilometers. Helicopter activity, although not really anticipated, also has the potential to disturb cetaceans and pinnipeds by causing them to vacate the area. Additionally, general vessel presence in the vicinity of traditional hunting areas could negatively impact a hunt. Native knowledge indicates that bowhead whales become increasingly “skittish” in the presence of seismic noise. Whales are more wary around the hunters and tend to expose a much smaller portion of their back when surfacing (which makes harvesting more difficult). Additionally, natives report that bowheads exhibit angry behaviors in the presence of seismic, such as tail-slapping, which translate to danger for nearby subsistence harvesters.

Plan of Cooperation or Measures to Minimize Impacts to Subsistence Hunts

Regulations at 50 CFR 216.104(a)(12) require IHA applicants for activities that take place in Arctic waters to provide a Plan of Cooperation or information that identifies what measures have been taken and/or will be taken to minimize adverse effects on the availability of marine mammals for subsistence purposes. BP signed the 2014 Conflict Avoidance Agreement (CAA) with the Alaska Eskimo Whaling Commission (AEWC), which is developed to minimize potential interference with bowhead subsistence hunting. BP also attended and participated in

meetings with the AEWG on December 13, 2013, and additional meetings in 2014. The CAA describes measures to minimize any adverse effects on the availability of bowhead whales for subsistence uses.

The North Slope Borough Department of Wildlife Management (NSB-DWM) was consulted, and BP presented the project to the NSB Planning Commission in 2014. BP held meetings in the community of Nuiqsut to present the proposed project, address questions and concerns from community members, and provide them with contact information of project management to which they can direct concerns during the survey. During the NMFS Open-Water Meeting in Anchorage in 2013, BP presented their proposed projects to various stakeholders that were present during this meeting.

BP will continue to engage with the affected subsistence communities regarding its Beaufort Sea activities. As in previous years, BP will meet formally and/or informally with several stakeholder entities: the NSB Planning Department, NSB-DWM, NMFS, AEWG, Inupiat Community of the Arctic Slope, Inupiat History Language and Culture Center, USFWS, Nanuq and Walrus Commissions, and Alaska Department of Fish & Game.

Project information was provided to and input on subsistence obtained from the AEWG and Nanuq Commission at the following meetings:

- AEWG, October 17, 2013; and
- Nanuq Commission, October 17, 2013.

BP will implement several mitigation measures to reduce impacts on the availability of marine mammals for subsistence hunts in the Beaufort Sea. Many of these measures were developed from the 2013 CAA and previous NSB Development Permits. In addition to the measures listed next, BP will conclude all airgun operations by midnight on August 25 to allow

time for the Beaufort Sea communities to prepare for their fall bowhead whale hunts prior to the beginning of the fall westward migration through the Beaufort Sea. Some of the measures mentioned next have been mentioned previously in this document:

- PSOs on board vessels are tasked with looking out for whales and other marine mammals in the vicinity of the vessel to assist the vessel captain in avoiding harm to whales and other marine mammals.;

- Vessels and aircraft will avoid areas where species that are sensitive to noise or vessel movements are concentrated;

- Communications and conflict resolution are detailed in the CAA. BP will participate in the Communications Center that is operated annually during the bowhead subsistence hunt;

- Communications with the village of Nuiqsut to discuss community questions or concerns including all subsistence hunting activities. Pre-project meeting(s) with Nuiqsut representatives will be held at agreed times with groups in the community of Nuiqsut. If additional meetings are requested, they will be set up in a similar manner;

- Contact information for BP will be provided to community members and distributed in a manner agreed at the community meeting;

- BP has contracted with a liaison from Nuiqsut who will help coordinate meetings and serve as an additional contact for local residents during planning and operations; and

- Inupiat Communicators will be employed and work on seismic source vessels. They will also serve as PSOs.

Unmitigable Adverse Impact Analysis and Determination

BP has adopted a spatial and temporal strategy for its Foggy Island Bay survey that should minimize impacts to subsistence hunters. First, BP's activities will not commence until

after the spring hunts have occurred. Second, BP will conclude all airgun and other active sound source operations by midnight on August 25 prior to the start of the bowhead whale fall westward migration and any fall subsistence hunts by Beaufort Sea communities. Foggy Island Bay is not commonly used for subsistence hunts. Although some seal hunting co-occurs temporally with BP's survey, the locations do not overlap. BP's presence will not place physical barriers between the sealers and the seals. Additionally, BP will work closely with the closest affected communities and support Communications Centers and employ local Inupiat Communicators. Based on the description of the specified activity, the measures described to minimize adverse effects on the availability of marine mammals for subsistence purposes, and the required mitigation and monitoring measures, NMFS has determined that there will not be an unmitigable adverse impact on subsistence uses from BP's activities.

Endangered Species Act (ESA)

Within the project area, the bowhead whale is listed as endangered and the ringed and bearded seals are listed as threatened under the ESA. The NMFS Office of Protected Resources Permits and Conservation Division consulted with the NMFS Alaska Regional Office (AKRO) Protected Resources Division (PRD) on the issuance of an IHA under Section 101(a)(5)(D) of the MMPA because the action of issuing the IHA may affect threatened and endangered species under NMFS' jurisdiction. On June 19, 2014, NMFS AKRO PRD issued a Biological Opinion, which concluded that the issuance of an IHA to BP for the shallow geohazard survey is not likely to jeopardize the continued existence of the endangered bowhead whale, threatened Arctic subspecies of ringed seal, or the threatened Beringia distinct population segment of bearded seal. There is no critical habitat for any of these species in the survey area.

National Environmental Policy Act (NEPA)

NMFS prepared an EA that includes an analysis of potential environmental effects associated with NMFS' issuance of an IHA to BP to take marine mammals incidental to conducting a shallow geohazard survey program in the Beaufort Sea, Alaska. NMFS has finalized the EA and prepared a FONSI for this action. Therefore, preparation of an Environmental Impact Statement is not necessary.

Authorization

As a result of these determinations, NMFS has issued an IHA to BP for conducting a shallow geohazard survey in the Foggy Island Bay area of the Beaufort Sea, Alaska, during the 2014 open-water season, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: June 25, 2014.

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